face. There were no stalactites in this cavern, as there generally is in those which contain no bones, and it was perfectly dry and free from rubbish.

From a note annexed to this letter by Sir Everard Home, the bones alluded to appear to be the grinder of the upper jaw of the single-horned rhinoceros. Two grinders, two tusks, and portions of two tibiæ of the brown or black bear; and portions of bones of an animal of the deer kind.

These specimens are deposited in the Museum of the College of Surgeons.

On the Aëriform Compounds of Charcoal and Hydrogen; with an Account of some Additional Experiments on the Gases from Oil and from Coal. *By* Willian Henry, *M.D. F.R.S. &c.* Read February 22, 1821. [*Phil. Trans.* 1821, *p.* 136.]

In this paper, after adverting to the sources, properties, and composition of carburetted hydrogen obtained from stagnant water, and of olefiant gas procured from the decomposition of alcohol; and after examining the agency of chlorine upon these compounds; the author proceeds to examine the gas procured by the decomposition of oil and of coal at high temperatures. The former, or oil gas, is shown to vary considerably in composition and properties, according to the temperature at which it is procured; and though no temperature short of ignition is sufficient for the decomposition of oil into permanent combustible gases, yet the lower the heat the more combustible is the gas, and better suited to artificial illumination.

In analysing these gases, Dr. Henry always found them mixtures of olefiant, carburetted hydrogen, hydrogen, and carbonic oxide gases. Dr. Henry separated the first by the action of chlorine, and from the detonation of the residue with oxygen, as compared with an artificial mixture of known composition, he ascertained the relative proportions of its components.

It appears from the tables exhibiting these results, that in oil gas the proportion of carbonic oxide is greater than in that from coal, but that carburetted hydrogen is most abundant in the latter. The proportion of hydrogen appears to increase in both as they are formed at higher temperatures, and is always greatest in the latter portions of coal gas; but Dr. Henry never found that either oil or coal gas, after the action of chlorine with the exclusion of light, presented a residue of pure hydrogen.

In the concluding section of this paper, the author details some experiments which led him to consider that portion of oil gas which is condensible by chlorine, not as mere olefiant gas, but as a peculiar compound, requiring nearly two volumes of oxygen more for its combustion than an equal quantity of olefiant gas, and affording one additional volume of carbonic acid; he therefore thinks that it must be considered either as containing a new compound of carbon and

hydrogen, or as deriving its peculiarities from an inflammable vapour. To this new gaseous compound much of the illuminating power of coal and oil gas is to be attributed.

An Account of Experiments to determine the Acceleration of the Pendulum in different Latitudes. By Captain Edward Sabine, *of the Royal Regiment of Artillery, F.R.S. and F.L.S.* Read March 8, 1821. [*Phil. Trans.* 1821, *p.* 163.]

The clocks and pendulums used in these experiments are the property of the Royal Society, and were prepared by their direction, under the superintendance of Captain Kater, whose description of them is quoted by the author at the commencement of this paper.

The experiments were made during two voyages of discovery in search of a North-west Passage, the first in 1818, and the second in 1819 and 1820; and Captain Sabine details in succession the proceedings at each station, where an opportunity was afforded of landing and setting up the clocks; and concludes by recapitulating the number of vibrations made by each pendulum in the different latitudes in which it was tried, and by stating the deductions regarding the figure of the earth which follow from the acceleration thus determined. In the first voyage, the number of vibrations was ascertained at two stations only; namely, at Gardie House on the Island of Brassa, and on Waygat, or Hare Island, on the West coast of Greenland; the latitude of the first being 60° 9′ 42″ N., and of the second 70° 26′ 17″ N. The number of vibrations in a mean solar day at London being 86497·4, at Brassa they were 86530·507, and at Hare Island 86562·6386; giving an acceleration of 33·107 vibrations between London and Brassa, and of 32·1316 between Brassa and Hare Island; or 65·2386 between London and Hare Island.

Captain Sabine next proceeds to detail the preliminary experiments relating to the pendulums, and the results of his various observations, made during the second voyage; from which it appears that at Melville Island in the Polar sea, in latitude 74° 47′ 12·4″ N., the mean diurnal acceleration amounted to 74·734 vibrations. From the observations detailed at length in this paper, respecting the length of the seconds' pendulum, at the several places of observation, it appears that its length at London being, as ascertained by Captain Kater, 39·13929 inches, at Brassa it is 39·16929 inches; at Hare Island 39·1984, and at Melville Island 39·207 inches. This paper concludes with a table, showing the diminution of gravity from the pole to the equator, and the resulting ellipticity of the earth, deduced from the preceding observations. The method followed in obtaining these deductions is the same which is described by Captain Kater in the Philosophical Transactions for 1819.